

ATTORNEY DOCKET NO.: 05015.0365U1
App. Serial No.: 09/662,965

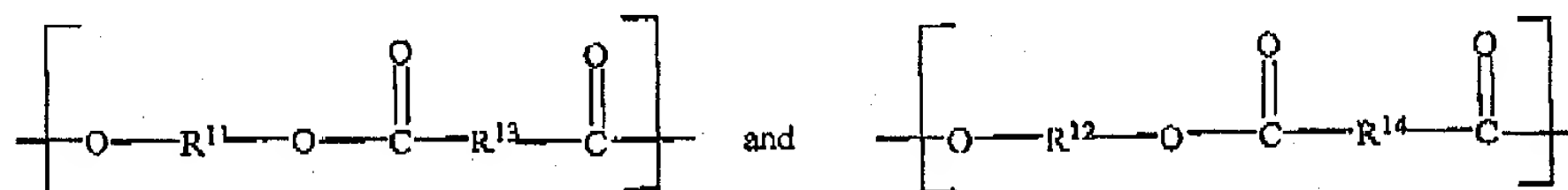
IN THE CLAIMS

1. (Four times amended) A method for preparing an article from a biodegradable polymer composition wherein the method comprises:

- a. introducing a phenol-containing compound comprising terpene-phenol resin into a biodegradable polymer or biodegradable polymer composition in an amount sufficient to slow the degradation rate of the biodegradable polymer or biodegradable polymer composition; and
- b. mixing the phenol-containing compound with the biodegradable polymer or biodegradable polymer composition;

wherein the biodegradable polymer or biodegradable polymer composition [comprises] consists essentially of [one or more of the following]:

1. an aliphatic-aromatic copolyester having repeat units of the following structures:



wherein

- (i) R^{11} and R^{12} are the same or different, and are residues of one or more of diethylene glycol, propylene glycol, 1,3-propanediol, 2,2-dimethyl-1,3-propanediol, 1,3-butanediol, 1,4-butanediol, 1,5-pentanediol, 1,6-hexanediol, 2,2,4-trimethyl-1,6-hexanediol, thiodiethanol, 1,3-cyclohexanedimethanol, 1,4-cyclohexanedimethanol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, triethylene glycol, or tetraethylene glycol;
- (ii) R^{11} and R^{12} are 100% of the diol components in the copolyester;

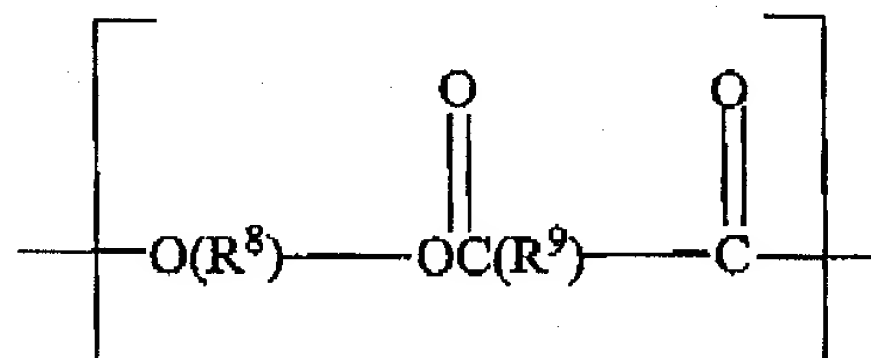
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(iii) R^{13} is absent or is selected from one or more of the groups consisting of $C_1 - C_{12}$ alkylene or oxyalkylene; $C_1 - C_{12}$ alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6 - C_{10}$ aryl, and $C_1 - C_4$ alkoxy; $C_5 - C_{10}$ cycloalkylene; and $C_5 - C_{10}$ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6 - C_{10}$ aryl, and $C_1 - C_4$ alkoxy; and

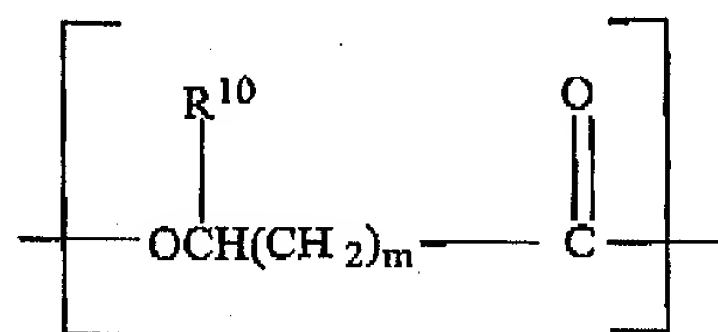
(iv) R^{14} is selected from one or more of the groups consisting of $C_6 - C_{10}$ aryl, and $C_6 - C_{10}$ aryl substituted with one to four substituents independently selected from the group consisting of halo, $C_1 - C_4$ alkyl, and $C_1 - C_4$ alkoxy;

[2. an aliphatic polyester having repeat units of one or more of the



following structures:

or



wherein m is an integer of from 0 to 10, and R^{10} is selected from the group consisting of hydrogen; $C_1 - C_{12}$ alkyl; $C_1 - C_{12}$ alkyl substituted with one to four substituents independently selected from the group consisting of halo, $C_6 - C_{10}$ aryl, and $C_1 - C_4$ alkoxy; $C_5 - C_{10}$ cycloalkyl; and $C_5 - C_{10}$ cycloalkyl

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substituted with one to four substituents independently selected from the group consisting of halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy, wherein R⁸ is selected from the group consisting of C₂-C₁₂ alkylene or C₂-C₁₂ oxyalkylene; C₂-C₁₂ alkylene or C₂-C₁₂ oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy; C₅-C₁₀ cycloalkylene; C₅-C₁₀ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy, and

wherein R⁹ is absent or is selected from one or more of the group consisting of C₁-C₁₂ alkylene or oxyalkylene; C₁-C₁₂ alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy; C₅-C₁₀ cycloalkylene; and C₅-C₁₀ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy; and

3) a C₁-C₁₀ cellulose ester having a DS equal to or less than about 2.5;] and

c. forming the biodegradable polymer composition into an article, wherein the article comprises: a film, a bottle, a blow molded article, an injection molded article or a container, and wherein the article exhibits a delayed biodegradation rate over an article formed from a biodegradable polymer composition not including the phenol-containing compound.

2. The method of claim 1 wherein the terpene-phenol resin comprises from about 1 to about 40 % by weight of phenol as measured by weight of the compound.

3. The method of claim 1 wherein the terpene-phenol resin comprises from about 5 to about 20 % by weight of phenol as measured by weight of the compound.

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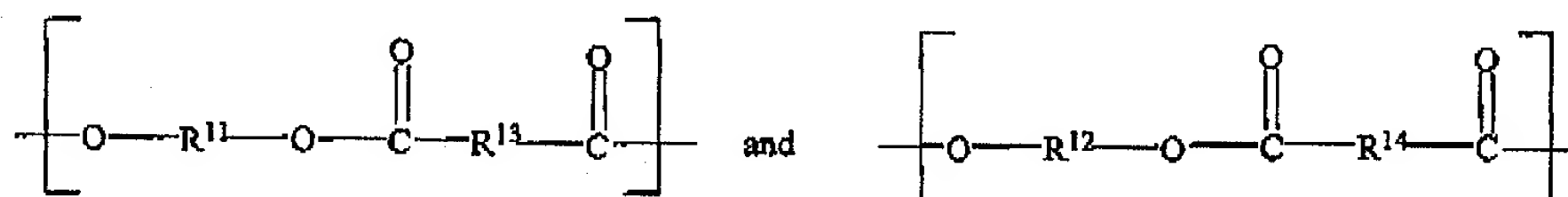
4. The method of claim 1 wherein the phenol-containing compound is present in the biodegradable polymer or biodegradable polymer composition at from about 0.5 to about 10 weight % as measured by the total weight of the biodegradable polymer or biodegradable polymer composition.
5. The method of claim 1 wherein the phenol-containing compound is present in the biodegradable polymer or biodegradable polymer composition at from about 1 to about 3 weight % as measured by the total weight of the biodegradable polymer or biodegradable polymer composition.
6. (Canceled)
7. (Three Times Amended) The method of claim 1 wherein [the biodegradable polymer or biodegradable polymer composition comprises] the aliphatic-aromatic copolyester and wherein R^{11} and R^{12} are the same or different, and are selected from the group consisting of residues of one or more of diethylene glycol, propylene glycol, 1,3-propanediol, 1,3-butanediol, and 1,4-butanediol, R^{13} is selected from the group consisting of malonic acid, succinic acid, glutaric acid, adipic acid, pimelic acid, 2,2-dimethyl glutaric acid, diglycolic acid, and an ester forming derivative thereof, and R^{14} is selected from the group consisting of one or more of 1,4-terephthalic acid, 1,3-terephthalic acid, 2,6-naphthoic acid, 1,5-naphthoic acid, and an ester forming derivative thereof.
8. (Canceled)
9. The method of claim 1, wherein the biodegradable polymer or biodegradable polymer composition comprises one or more of: a pigment, a dye, an opacifying agent, an antioxidant, an ultraviolet stabilizer, an optical brightener, an aliphatic acid, a metal salt, an antistatic agent, an antiblocking aid, a filler, a dispersing agent, a coating aid, a slip agent, a lubricant, starch, wood, and flour.

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10. - 21. (Canceled)

22. (Four times amended) A biodegradable polymer composition for making an article comprising a film, a bottle, a blow molded article, an injection molded article or a container, wherein the biodegradable polymer or biodegradable polymer-second material composition comprises:

- a. a phenol-containing compound comprising terpene-phenol resin incorporated in the biodegradable polymer or biodegradable polymer-second material composition, the phenol-containing compound being present at an amount sufficient to slow the degradation rate of the biodegradable polymer or biodegradable polymer second-material composition; and
- b. a biodegradable polymer or biodegradable polymer-second material composition [comprising one or more of the following] consisting essentially of:
 1. an aliphatic-aromatic copolyester having repeat units of the following structures:



wherein

- (i) R^{11} and R^{12} are the same or different, and are residues of one or more of diethylene glycol, propylene glycol, 1,3-propanediol, 2,2-dimethyl-1,3-propanediol, 1,3-butanediol, 1,4-butanediol, 1,5-pentanediol, 1,6-hexanediol, 2,2,4-trimethyl-1,6-hexanediol, thiodiethanol, 1,3-cyclohexanedimethanol, 1,4-cyclohexanedimethanol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, triethylene glycol, or tetraethylene glycol;
- (ii) R^{11} and R^{12} are 100% of the diol components in the copolyester;

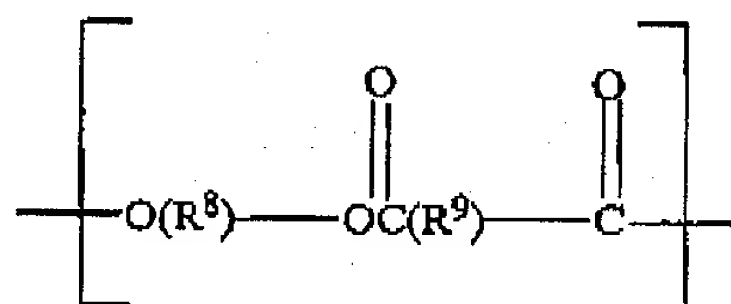
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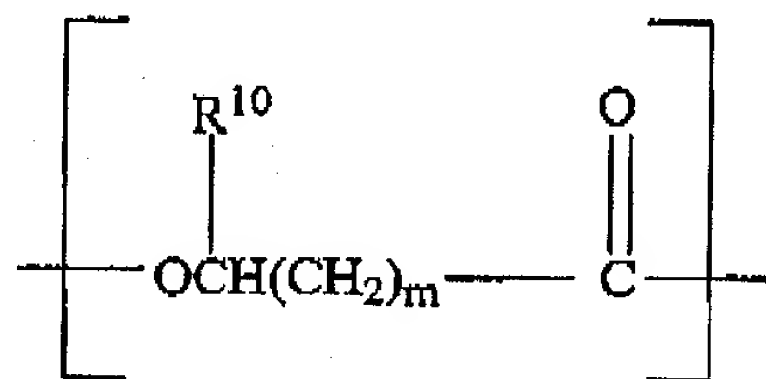
(iii) R^{13} is absent or is selected from one or more of the groups consisting of $C_1 - C_{12}$ alkylene or oxyalkylene; $C_1 - C_{12}$ alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6 - C_{10}$ aryl, and $C_1 - C_4$ alkoxy; $C_5 - C_{10}$ cycloalkylene; and $C_5 - C_{10}$ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6 - C_{10}$ aryl, and $C_1 - C_4$ alkoxy; and

(iv) R^{14} is selected from one or more of the groups consisting of $C_6 - C_{10}$ aryl, and $C_6 - C_{10}$ aryl substituted with one to four substituents independently selected from the group consisting of halo, $C_1 - C_4$ alkyl, and $C_1 - C_4$ alkoxy;

[2] an aliphatic polyester having repeat units of one or more of the following structures:



or



wherein m is an integer of from 0 to 10, and R^{10} is selected from the group consisting of hydrogen; $C_1 - C_{12}$ alkyl; $C_1 - C_{12}$ alkyl substituted with one to four substituents independently selected from the group consisting of halo, $C_6 - C_{10}$ aryl, and $C_1 - C_4$ alkoxy; $C_5 - C_{10}$ cycloalkyl; and $C_5 - C_{10}$ cycloalkyl

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substituted with one to four substituents independently selected from the group consisting of halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy, wherein R⁸ is selected from the group consisting of C₂-C₁₂ alkylene or C₂-C₁₂ oxyalkylene; C₂-C₁₂ alkylene or C₂-C₁₂ oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy; C₅-C₁₀ cycloalkylene; C₅-C₁₀ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy, and

wherein R⁹ is absent or is selected from one or more of the group consisting of C₁-C₁₂ alkylene or oxyalkylene; C₁-C₁₂ alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy; C₅-C₁₀ cycloalkylene; and C₅-C₁₀ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy; and

3) C₁-C₁₀ cellulose ester having a DS equal to or less than about 2.5,]

and wherein the article exhibits a delayed biodegradation rate over an article formed from a biodegradable polymer composition not including the phenol-containing compound.

23. (Canceled)

24. (Twice amended) The biodegradable polymer composition of claim 22 wherein [the biodegradable polymer or biodegradable polymer-second material composition comprises the aliphatic-aromatic copolyester and wherein] R¹¹ and R¹² are the same or different, and are selected from the group consisting of residues of one or more of diethylene glycol, propylene glycol, 1,3-propanediol, 1,3-butanediol, and 1,4-butanediol, R¹³ is selected from the group consisting of malonic acid, succinic acid, glutaric acid, adipic acid, pimelic acid, 2,2-dimethyl glutaric acid, diglycolic acid, and an ester forming derivative thereof, and R¹⁴ is